RELATIONSHIP BETWEEN CIRCULATION TYPES AND PRECIPITATION OVER SPAIN

M. J. Casado [1], M. A. Pastor [1] and F. J. Doblas-Reyes [2]

(1) Agencia Estatal de Meteorología (AEMet), Madrid, Spain (mjcasado@inm.es)
(2) European Centre for Medium-Range Weather Forecasts (ECMWF), Reading,UK

1. OBJECTIVE

The main goal of this study is to analyze the relationship between Circulation Types (CTs) frequencies and the precipitation over Iberian Peninsula and Balearic Archipelago as a testing application of the classifications from the COST733 Action: "Harmonisation and Applications of Weather Types Classifications for European Regions"

2. DATA

COST733 classifications are based on the same gridded climatic data (ERA40 reanalyses, 1ºx1º resolution) and computed for twelve domains (Fig. 1). We have considered the D09 domain (Iberian West Mediterranean area).

Daily gridded precipitation data (203 grid points, Fig. 2) from the Agencia Estatal de Meteorología (AEMet) Climatological data base.

Temporal domain: extended winter (DJFM) for 1961-1990 period.

Figure 1

Classifications
CKMEANS
ESLP
KH
LUND
NNW
PCACA
PETISCO
SANDRA
SANDRAS
TPCA

Table 1

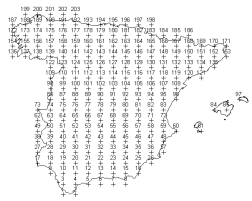

Figure 2

3. METHODOLOGY

To test the ability of each classification to discriminate the precipitation over Spain, we have computed a) spatial maps of the standard deviation (STD) of the precipitation percentages (fig.3) and b) the averages of the former spatial maps (fig. 4).

We have considered 10 classifications (Table 1) of the version 1.2 of COST733 catalogue which has three sub-catalogues with 9, 18 and 27 CTs respectively, in order to analyse the impact in the STD of precipitation percentage when considering different number of CTs and different classifications.

4. RESULTS

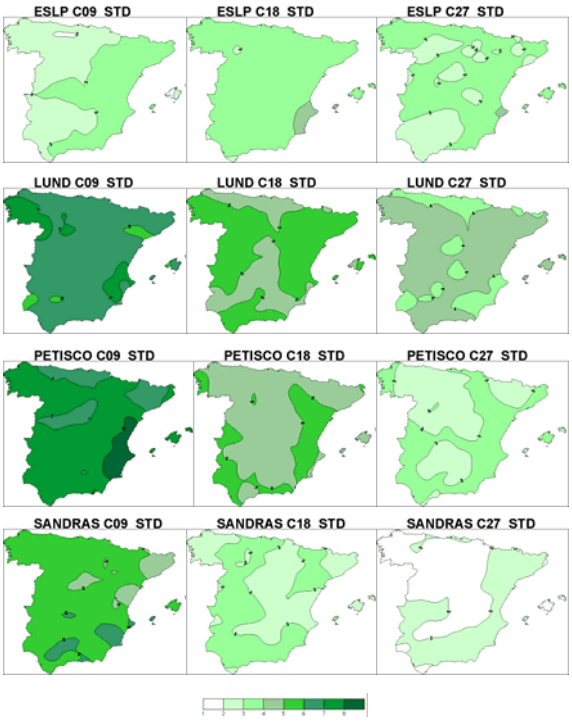

Figure 3: Spatial maps of the STD Precipitation Percentages for 4 classifications

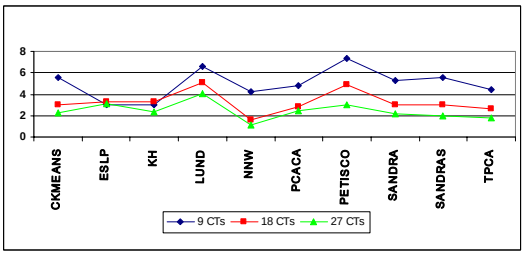

Figure 4: STD Precipitation Percentages (Mean Value)

5. SUMMARY

- As a general rule, the STD values of precipitation percentages over Iberia and Balearic Archipelago diminish when increasing the number of CTs, with the exception of ESLP and KH classifications which present very similar values for 9, 18 and 27 CTs (Figs. 3-4).
- Focusing on each classification, not many differences are observed in the STD values of precipitation percentage when considering 18 or 27 CTs.
- The classifications with higher values of STD are: PETISCO and LUND for 9 and 18 CTs, and LUND, PETISCO and ESLP for 27 CTs. The classifications with lower values of STD are: ESLP and KH for 9 CTs, and NNW for 18 and 27 CTs (Fig. 4).

6. CONCLUSIONS

- The STD values of precipitation percentages are best discriminated when considering 9 CTs.
- The most noticeable differences in the spatial maps of dispersion of precipitation percentages within classifications are observed mainly when going to larger number of CTs.
- The classifications which best discriminate the STD values of precipitation percentages are: PETISCO and LUND for 9 and 18 CTs and LUND, PETISCO and ESLP for 27 CTs.

7. ACKNOWLEDGEMENTS

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